












# Programme of the 12<sup>th</sup> Karlsruhe International School on Fusion Technologies






## Monday 03/09/2018

9:00-9:15	Opening of the summer school	C. Schweier	
<b>Topic 1: Introduction to fusion</b>			
9:15-10:15	Future energy and the role for fusion	R. Kembleton	
10:15-11:30	Fusion and the characteristics of fusion power plants	R. Kembleton	
11:15-11:30	coffee break		
11:30-12:15	Basic physics of a tokamak	R. Kembleton	
<b>Topic 2: Plasma physics</b>			
13:30-14:30	Introduction to plasma physics (I)	B. Pégourié	
14:30-14:45	coffee break		
14:45-16:00	Introduction to plasma physics (II)	B. Pégourié	






## Tuesday 04/09/2018

<b>Topic 3: Technology of magnetic confinement</b>			
9:00-10:30	Superconductivity and magnet technology	W. Fietz	
10:30-10:45	coffee break		
10:45-11:30	Structural materials at cryogenic temperatures	K.-P. Weiss	
11:30-12:45	Visit to TOSKA + CryoMaK	W. Fietz / K. Weiss	
13:45-15:15	High temperature superconductivity	W. Fietz / M. Wolf	
15:15-15:30	coffee break		
15:30-16:30	Manufacturing of superconducting magnets	A. Hobl	

## Wednesday 05/09/2018






<b>Topic 4: The fuel cycle of a fusion reactor</b>			
9:00-10:40	Tritium handling + tritium plant of fusion reactor	L. Frances	
10:40-11:00	coffee break + group photo		
11:00-12:00	Visit to TLK	L. Frances	
13:00-14:00	ITER fuel system	S. Maruyama	
14:00-15:00	Vacuum pumping systems and DEMO inner fuel cycle (I)	C. Day	
15:00-15:15	coffee break		
15:15-16:00	Vacuum pumping systems and DEMO inner fuel cycle (II)	C. Day	

## Thursday 06/09/2018

<b>Topic 5: Blankets</b>			
9:00-10:30	Basics of breeding blanket technology	L. Boccaccini	
10:30-10:45	coffee break		
10:45-12:15	Solid breeder blanket	L. Boccaccini	
13:15-14:45	Liquid metal blanket	I. Ricipito	
14:45-15:00	coffee break		
15:00-15:45	Tritium breeder materials	M. Kolb	
15:45-16:45	Magnetohydrodynamics of liquid metals	L. Bühler	

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**Friday 07/09/2018**






<b>Topic 6: Safety, socioeconomics and waste</b>			
9:00-10:00	Practical Implementation of nuclear engineering aspects within the ITER Electron Cyclotron Launcher	P. Wouters	
10:00-11:00	General safety analysis approach and techniques	L. Di Pace	
11:00-11:15	coffee break		
11:15-12:30	Structural analysis and test for nuclear licensing of fusion reactor	D. Combescure	
<b>Topic 7: Materials development for fusion reactors</b>			
13:30-14:30	Structure and texture of metallic solids	M. Rieth	
14:30-14:45	coffee break		
14:45-15:45	High temperature materials	M. Rieth	

**Sunday  
09/09/2018**  
Excursion to  
Speyer  
11:30-22:00








Registration required

**Monday 10/09/2018**






<b>Topic 7: Materials development for fusion reactors</b>			
8:00-10:15	Presentation of the Fusion Materials Laboratory (FML)/ Visit to FML	H.-C. Schneider	
10:15-10:30	coffee break		
<b>Topic 8: Neutronics and activation analysis</b>			
10:30-12:00	Fusion neutronics – methods, data, applications I	U. Fischer	
13:00-14:30	Fusion neutronics – methods, data, applications II	U. Fischer	
<b>Topic 9: Divertors</b>			
14:30–15:30	Divertors in magnetically-confined fusion devices	B. Ghidersa	
15:30-15:45	coffee break		
15:45-16:45	Manufacturing processes for High Heat Flux Components	E. Visca	

**Tuesday 11/09/2018**







<b>Topic 10: Remote handling, maintenance scheme</b>			
9:00-11:00	Remote handling maintenance scheme	E. Villedieu	
11:00-11:15	coffee break		
11:15-12:00	Assembling of Tokamak components	T. Mull	
12:00-12:45	Availability considerations for future fusion power plants	T. Mull	
<b>Topic 11: Cooling aspects</b>			
14:00-15:15	Design, manufacture and operation of water cooled plasma facing components	R. Mitteau	
15:15-15:30	coffee break		
15:30-16:30	Visit to HELOKA facilities	A. Kunze	

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## Wednesday 12/09/2018

<b>Topic 11: Cooling aspects</b>			
9:00-10:00	Cryogenics	H. Neumann	
<b>Topic 12: Plasma heating technology and plasma diagnostics</b>			
10:00-11:30	Gyrotrons	G. Gantenbein	
11:30-13:00	Visit of Gyrotron Test Stand	G. Gantenbein	
14:00-15:15	ECRH upper port plugs and diamond window technology	S. Schreck	
15:15-15:30	coffee break		
15:30-16:30	Plasma diagnostics in fusion devices	R. Sabot	

## Thursday 13/09/2018

<b>Topic 12: Plasma heating technology and plasma diagnostics</b>			
9:00-9:45	Introduction to neutral beam injection technology	I. Day	
<b>Topic 13: Operating and planned facilities</b>			
9:45-10:30	JET	I. Day	
10:30-11:15	DEMO and the route to fusion power (part 1)	I. Jenkins	
11:15-11:30	coffee break		
11:30-12:30	DEMO and the route to fusion power (part 2)	I. Jenkins	
13:30-15:30	Wendelstein 7-X	R. Wolf	
15:00-15:15	coffee break		
15:15-16:00	ASDEX upgrade	W. Suttrop	

## Friday 14/09/2018

<b>Topic 13: Operating and planned facilities</b>			
9:00-10:30	ITER	T. Hirai	
10:30-10:45	coffee break		
10:45-11:45	Tore Supra and the WEST project	J. Bucalossi	
11:45-12:45	JT-60SA	J. Bucalossi	
12:45-13:00	Final discussion, hand-out of certificates	C. Schweier	